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ABSTRACT

This paper describes a movement by South Carolina educators over the last 10 years to integrate telecomputing into the existing curriculum and presents ideas for furthering this goal. The paper identifies four services that are seen as the most essential for all members of the educational community--students, teachers, and administrators alike: (1) personal access to electronic mail, both at school and at home; (2) immediate access to a school-wide bulletin board system giving announcements, events, and specific messages; (3) classroom access to word-processing, databases, and multimedia authoring programs; and (4) classroom access to online research materials either from the school library media center, or via the Internet. The technology already exists to make all of these services and others available; what is needed now is commitment from teachers, administrators, governing bodies, and the financial controllers. A 23-item list of print and video references is included. (JLB)

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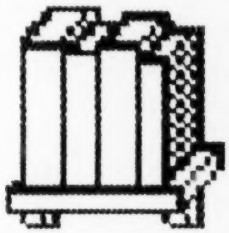
Telecomputing



Into the Curriculum of South Carolina's Educational System

by Catherine M. Townsend
Summer 1993

IR055075

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INTEGRATING TELECOMPUTING INTO THE CURRICULUM
OF SOUTH CAROLINA'S EDUCATIONAL SYSTEM

The suggestions for implementing telecomputing into the existing curriculum, outlined in this paper, are merely a written version of a collective oral thought process that has been growing and maturing over the past 10 years among educators throughout the state. This educational tool will not be ignored by those teachers and administrators who want to continue providing the best possible education for their students. It will be used. How it might BEST be used has been the basis for these discussions. It is generally agreed* that telecomputing allows students to:
--practice and use their communication skills in a real world way;
--understand, evaluate, and use a variety of resources in pursuing a specific objective;
--increase their interest and motivation in learning so they will continue their education;
--gain confidence and experience using computer technology and communications so they are more competitive in the global economy;
--access real world information sources in real world situations;
--make and maintain national and international contacts;
--develop a broader understanding of the global interconnectability of their culture and the culture of others.

South Carolina has had a active grass-roots movement towards establishing a state network for data and message transmission since the mid-1970's. The CUFAN Network itself was the Clemson Extension Services' answer to providing a better means of communications for its 42 county offices back to the state center at Clemson University in the Agricultural College. Funded initially by a major Federal Department of Agriculture grant, this system established a distributed network throughout the state with local dial-in access in each county seat. This gave local phone call access to Clemson's Computer Center to virtually the entire state. Shortly after the CUFAN system of leased lines was completed the South Carolina Occupational Information System, (SCOIS) supported by the South Carolina Employment Office, began using this network to deliver its services to high schools, public libraries, and universities across the state.

With the passage of the Educational Finance Act in 1978 South Carolina began the current long and serious look at education within its boundaries. In 1984 the State Legislature through the Educational Improvement Act, funded a project called Pathway, which was an attempt to simplify the repetitive and demanding paperwork faced by classroom teachers. Pathways has been refunded through the Legislature each year. It was initially designed to link every school within the state by a local call to its district office and then to the Educational Data Center at the State Department of Education using CUFAN's system of county nodes. Schools and districts were provided with the hardware (computers, modems, and lines), the software (Osiris and Relay Gold)

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*these educational outcomes are a summary of those found in the sources listed at the end of this paper.

and training (coordinators from each school and district within the state) to fully implement this system.

In the summer of 1987 another milestone in educational reform was begun here in South Carolina. With funding provided by the Rockefeller Foundation, REACH, the Rural Education Alliance for Collaborative Humanities, was created and its administrative headquarters was established at Clemson University. An integral part of this new educational initiative was the formation of a network of educators interested in reform and improvement in education. A major program which has emerged from this project has been the formation of the South Carolina Network for Educational Telecomputing. This network of people has its headquarters at the University of South Carolina. SCNET has been using the CUFAN system to create an electronic community of educators interested in education across the state and nation who exchange e-mail, participate in online discussions, and retrieve information via computer. Using the CUFAN network of county nodes, this human network contains more than 1000 active "usernames" with the "NT.." designation, a way of signaling the Clemson Computer that the user assigned that username is a SCNET member. Because many of the usernames have multiple users, the actual number of teachers using the SCNET on a regular basis is hard to determine. For instance, the 150 Associate School members use only one username per school, and yet there may be as many as 30 teachers per site using that specific username. There are other members of SCNet who have other username designations.

In June of 1992, after four years of growth and evolution within the network itself, Dr. Kemble Oliver, the Director of the SCNET wrote the following:

SCNET:Premises and Objectives

PREMISES

1. Electronic mail and electronic discussion forums ASSUME the ability to read and to write. Using electronic mail to communicate and participating in discussion forums online encourage text literacy and motivate critical and creative debate.
2. Electronic mail and discussion software complement and enrich the power of classroom instruction and educational television. Even low technology telecomputing has enormous untapped potential for supporting collaborative research--in all disciplines. We can use it to help one another.
3. Telecommunicating between individuals within South Carolina, and between individuals in other states and countries illuminates our understanding of ourselves and others. The cultural diversity within our state should be a source of strength and flexibility in the world, not a handicap. We MUST learn from each other.

The question is not WHETHER our children will learn to use telecomputing. The question is WHEN they will learn. And the question is WHO: Will we encourage all of our children to learn to use telecomputing or just those privileged to attend school in the more affluent areas of our state? There

must be equitable electronic access to information, people, and resources without regard to location or financial circumstance.

OBJECTIVES

1. To encourage individuals, groups, and organizations to become adept participants in online discussion forums--and to provide moderator training and technical assistance for those who would like to assume such responsibilities.
2. To encourage individuals, groups, and organizations to use electronic mail to communicate with individuals and members of institutions and organizations--and to provide training and technical assistance for those who need help.
3. To encourage individuals to explore the rich and growing diversity of resources and information that are available through telecomputing--and to share the results of their exploration with the rest of us. These would include such resources as SERVE-line, FrED Mail, Academy One, BreadNet, IRIS, PSInet, AppleLink, Prodigy, Online America, GCEDUNet, Dialogue, EASYNET, and a panoply of other resources such as LION, LUIS, USCAN, CARL and CUFAN itself.

Out of this philosophy has sprung an increasing number of projects throughout the state that "stay in touch" through telecomputing. One of these is the Center for School Leadership at Winthrop University. Barbara Gottsman directs this project and the 103 members of the Center use e-mail to receive and send information to each other on a regular basis. The REACH schools themselves, approximately 35 this year, use telecomputing with their students and among themselves to keep abreast of what's going on in the world. Members of the Executive Board of the South Carolina Association of School Librarians is now using telecomputing to "meet" about matters not vital to the Board as a whole. According to the PROJECT REACH TELECOMMUNICATIONS GRANT ANNUAL REPORT TO THE BELLSOUTH FOUNDATION, 1992-1993, written by Dr. Oliver, there are seven state-wide projects or organizations and six post-secondary institutions which have contributed to the funding of telecomputing for their members. These collaborators in the telecomputing process are, in addition those already mentioned, The South Carolina Cross Age Tutoring Project, The South Carolina Governor's School for Science and Mathematics, The Writing Improvement Network, the South Carolina Writing Projects, Clemson University, York Technical College, Winthrop University, The USC College of Engineering, The State Board for Technical and Comprehensive Education, and the Citadel. The Distance Education Program at the College of Library and Information Science (Davis College)-USC, headed by Dr. Dan Barron, uses telecomputing throughout its program to send and receive class assignments, keep track of student progress and answer questions not thought of while in class. At present this project covers not only South Carolina, but five other states across the nation. SCNET has also built an impressive public forum of support and cooperation through the number of "conferences" that are supported by its members. There are active conferences in the areas of instructional reform and assessment, language arts, fine

and performing arts, instructional technology, history and social studies, and science and mathematics.

There is a vast "army" of teachers in the field who have begun using telecomputing with their students. Many of these are members of SCNET and others use the packages provided by such sources as National Geographic Kids Network, AT&T's Learning Link, Global's World Classroom, CNN's Newsroom, and South Carolina's very own "Dr.Bob" Network for Science and Computing out of Clemson's College of Engineering. Many others however, have jumped into the ocean of the InterNet to provide their students with real world opportunities for information exchange, research, and communications with other students throughout the globe. They have even communicated out into space with the astronauts. Jeanne Sink, the State Teacher of the Year, and Helen Newton, the French instructor at Daniel High School, are both REACH Site Project Managers and committed users of telecomputing. They and their students participated in international student exchanges via the InterNet and KIDS-92/93, a discussion group that links students in 28 countries throughout the world.

Education in South Carolina has reached "critical mass." It must address itself to solving the problems of the future with the tools of that future, or it must settle for providing only a back seat for its citizens in tomorrow's economic and political arenas. Part of the process for addressing the future is the development of a long-range plan for the use of telecomputing within the state. Use of this technology cannot be limited to k-12 educational bodies, just as the use of telephones and cars is not limited to any one segment of the economy. Telecomputing allows students, teachers and parents to extend their learning far beyond the classroom, into the home and then on into the real world. In order to determine how educators and interested individuals in South Carolina felt about this issue, a simple, questionnaire was given during presentations at conferences dealing with technology in the Winter of 1993. The results could be considered "biased" in that those responding were predisposed toward technology in the first place, or they would not have attended these workshops. There were a total of 29 responses gathered from these sessions. The collection of general remarks were gathered from conversations held at various times during the conferences, as well as written comments on the survey forms. In all, approximately 91 individuals were contacted for their thoughts on this topic. What emerged from these conversations was a list of services common to all areas of education which were seen as being necessary for excellence in education to take place. Listed below are the four services seen as "most essential" for all members of the educational community, students, teachers and administrators alike.

1-Personal access to electronic mail, both at school and at home.
2-Immediate access to a school-wide bulletin board system giving announcements, events and special messages.
3-Classroom access to word-processing, databases, and multi-media authoring programs.
4-Classroom access to on-line research materials, either from the school library media center, or via the InterNet.

The specific responses to the survey are listed here with the ideas and suggestions which surfaced from these discussions. These responses are divided by educational service groups found with a school system.

STUDENT SERVICES

71% of those responding to the questions on the survey and those asked in person indicated they would like to see ALL of these services provided in EACH classroom. These services are :

--access to a school-wide bulletin board system giving announcements, events and special messages;

-- access to word-processing, databases, and multi-media authoring programs for reports and information processing.

-- access to individualized, remedial/accelerated instruction from integrated interactive courseware.

-- access to on-line reference materials from CD-ROM sources, laser disks, and informational data-bases;

-- electronic mail, in-school, within district, state to state, national or international. This access could provide growth and peer conferencing/tutoring, and resource sharing;

-- on-line access to the school media center catalog and catalogs from other schools within the district;

-- video teleconferencing for information sharing and exchanges available in selected classroom.

Additionally, several individuals who expressed their thoughts about the types of services which should be provided indicated that access to school library media center catalogs should be possible from homes for home-bound students and for students to use during the evening. It was also felt by some that students should have unrestricted access to the same informational databases and resources that adults have through the InterNet and other computer networks.

Remarks taken from the surveys and in conversation with teachers and others across the state include the following that relate specifically to teaching and student use of telecomputing:

**Students that are homebound, hospitalized, etc, would not get too far behind in classwork.

**Students could use this system when studying about other states, cultures, and people.

**I would find it very useful especially with homebound students.

**If students came into contact with other cultures it could be useful, but it would not be my main source of teaching within the classroom.

**It would be useful in addition to the established curriculum as enrichment.

**This would be a great resource for learning in all areas.

One individual went on to say that "Although everything listed above is wonderful, we must also consider change in school structure, i.e. staggered starts, year-round schools, home-to-home, home-to-school instructional communication via computer, self-paced learning, etc. The classroom as we know it now, as we've known it in the past, is passing away. What we dream can be!"

TEACHER SERVICES

68% of those responding to the survey or to questions asked in person

indicated they would like to see ALL of these services provided. These services are:
--access to a school-wide bulletin board system giving announcements, events, messages and professional announcements from the administration;
-- access to student records and classroom management functions from a central file server;
-- access to a pool of assessment items constructed by other teachers and conforming to curriculum frameworks;
-- access to classroom activities/instructional materials libraries available on-line;
-- access to electronic mail, in-school, within district, state to state, national or international. This access could provide professional growth/exchanges, peer conferencing/tutoring, and resource sharing;
-- access to video teleconferencing for individual or small group in-service.

Listed below are some of the resources that teachers and other interested people feel should be made available to both teachers and students within classrooms through telecomputing:
**Database on schools in S.C., like the school directory that is published by the state department available on-line.
**An index of books that relate to topics requested by teachers that would assist slms in selecting books for curricular areas.
**An automated magazine of newsworthy events in all fields.
**An on-line "books in print" of state adopted instructional materials.
**Menu access to KidsNet, Academy One, SERVE, university libraries, the State Library.
**On-line ITFS schedules and changes.
**On-line access to State AV Library holdings, government agencies.
**Information should be included concerning workshops and courses available for all areas. An option should be included to share problems with opportunities for others to offer solutions that have worked for them. It must be noted that most schools (media centers and classrooms) do not have access to telephones.

Another suggestion made during one conversation while material was being gathered for this report was that the North American Presentation Language Protocol Syntax should be available within the network to make "teaching" online with charts, graphs, diagrams, etc. possible. Also said one respondent, "Teachers should be able to input basic grades and the administration should generate all reports... An entry level clerk should handle it."

ADMINISTRATIVE SERVICES

75% of those responding to the survey or to questions indicated they would like to see ALL of these services provided for administrators. These services are:
-- an administrative bulletin board system, from the district and from the state;
-- access to electronic mail, in-school, within district, state to state, national or international. This access could provide professional growth/exchanges, peer conferencing/tutoring, and resource sharing;

-- access to school testing information and data transfers;
-- access to report card and student/teacher evaluation activities and file maintenance;
-- access to video teleconferencing for individual or small group discussions.

To determine if school district administrators themselves were promoting the use of telecomputing among their faculty and staff, a telephone survey completed with the assistance of members of the South Carolina Association of School Librarians, was conducted during the winter of 1993. It was found that of the five regions from which information was obtained, only twenty nine (29) districts out of the sixty (60) queried had actually implemented a telecomputing network using the hardware and software provided through the Pathways Project Funding. This survey was also used as a way to determine how many of the schools, secondary and K-8, had begun automating their media centers and/or had installed a distributed network within the school. The results of this survey are included here.

TOTALS FROM THE RESPONDING REGIONS

Reg#	#Dis	E-mail	Total	Sec	Sec/A	Sec/N	K-8	K-8/A	K-8/N
1-Mountains	17	9	256	40	20	3	216	58	7
2-Up State	7	6	78	15	8	3	63	16	8
4-Midlands1	9	9	91	22	13	7	69	36	6
5-Midlands2	14	0	68	17	6	0	51	12	1
7-UpperCoast	9	4	89	17	19	1	72	0	0
9-LowerCoast	4	1	129	24	8	0	105	19	0
Total:	60	29	711	135	74	14	576	141	22

Reg#= Number of SC Regional Network Area. These are based on the state's legislative districts.
#Dis=Number of districts within the region (special districts and private schools were omitted from this count).
E-Mail=number of districts with e-mail network or BBS within the region. Both the largest districts, Greenville and Charleston and the smallest, Orangeburg(s) and Anderson(s) are included.
#-Sch=Total number of schools in the region (vocational centers, magnet schools, and other "special schools" were omitted from this count).
Sec=number of secondary schools within the region.
Sec/A=Number of secondary schools with automated media centers within the region.
Sec/N=Number of secondary school with distributed networks within the region.
K-8=Number of K - 8 schools (this includes junior high schools) within the region.
K-8/A=Number of K-8 schools with automated media centers within the region.
K-8/N=Number of K-8 schools with distributed networks within the region.

SUMMARY OF FINDINGS FROM RESPONDING REGIONS

Districts with BBS and e-mail networks to school offices	48%
Total number of schools with automation systems in their library media centers	30%
Secondary schools with automation systems either in place or contracts signed for	55%
Secondary schools with distributed networks (computers in classrooms linked to a central file server and/or access to LMC catalog on-line)	10%
K - 8 schools with automation systems either in place or contracts signed for	24%
K - 8 schools with distributed networks (computers in classrooms linked to a central file server and/or access to LMC catalog on-line)	4%

The more than 1000 members of the SC Association of School Librarians have been advocates of technology in education from the very beginning, and many current, school-based, innovative technology programs have their beginnings in work done by the school media specialist and her classroom colleagues within that school.

IBM, in EDUQUEST, its provocative look at education for tomorrow suggests that each student will gather information and take notes using a personal notebook size "computer" which understands spoken language, supplies video and audio links around the world, functions as a personal database for report writing, and substitutes for a personal tutor when needed. Teachers and administrators will have direct access to student's homes and parents, schedules and records, be able to put together teaching units and lesson plans from their personal database of experts actually demonstrating or explaining the concept, and hold conferences with parents and/or social workers from the classroom via video/audio links. While these activities may still seem a distant dream, they are in actuality, just around the corner for today's students. The technological ability has already been established for these activities. Now all that is needed is for the teachers, their administrators, the governing bodies, and the financial controllers to commit themselves to making them available to South Carolina's future, her students of today.

REFERENCES IN PRINT FORMAT

These references have been arranged in order by title.

"AECT -- Forming Links to Excellence" by Inez L. Ramsey in FLORIDA MEDIA QUARTERLY, Vol.18, No.1, 1992.

Recommendation for integrating technologies:

> The emerging technologies provide individual users of information with learning opportunities beyond the resources of the school's media center. The media program provides access to and instruction in the utalization of resources beyond the school through networking, both formal and informal, while promoting the use of all types of libraries.

"Computer Industry CEOs Recommend a National Information Infrastructure" Press Release in AEMA Update, dated Jan 19, 1993.

"We believe the creation of a national information infrastructure must be a national priority, and we are willing to work in partnership with the government to see that it gets done. The Development of an information infrastructure will raise the standard of living for all Americans and enable our country to prosper in a competitive global economy." The Computer Systems Policy Project Report, titled "Perspectives on the National Information Infrastructure" defines this infrastructure as integrating four essential elements:

1-communications networks;
2-computers;
3-information;
4-people.

"Florida Schools Rewire for Technology," in ELECTRONIC LEARNING, September, 1992, p.6

The Retrofit for Technology Project is a one-year effort... to rewire and rebuild existing schools to accommodate, voice, video, and data technologies."

"FrEdMail Foundation..." T.I.E. NEWS published by the International Society for Technology in Education, Vol.4, No.1, p.20.

On October 11 (1992) the FrEdMail Foundation inaugurated SCHLnet, a service which takes FrEdMail projects and activities to thousands of teachers on other networks throughout the world.

"INFOhio: The Inforamtion Network for Ohio" by Carl Carter in OHIO MEDIA SPECTRUM, Vol. 44, No.4, 1992, p.74-85.

The Information Network for Ohio is a statewide cooperative project to create an electronic network linking Ohio students, teachers, library/media specialists and others via computers to:

-school libraries in the same district and across the state;
-college and university libraries;
-public and special libraries;
-electronic databases of government, education, and other information.

"Is There Networking in Your Future" by Dale Carrison, Minnesota State University Systems, in MINNESOTA MEDIA, Vol.17 No.1, Conference Highlights.

Networking is not a question of "if" but of "when." It is essential for all types of libraries and media centers because no one site can provide all the inforamtion resources needed by the primary users at that site.

THE MEDIA LAB: INVENTING THE FUTURE AT M.I.T., by Stewart Brand, 1987.

pp.24-25

"Minnesota K-12 Telecommunications Network..." Published in MEMOrandom, published by the Minnesota Educational Media Organization, September 15, 1992.

TIES will plan and implement a small regional network linked to InterNet to pilot the process of building a state wide network. The regional network will be used by TIES staff members and schools involved in a number of special projects already underway.

"The New Literacy: Beyond the Three Rs" by Maggie Hill in ELECTRONIC LEARNING September 1992, pp.28-34.

Literacy Skills for the 21st Century:

Accessing -- Reading text both in print and digital forms;
Listening -- in person, videoconferences, and on the phone;
Researching -- Print and online.

Thinking -- Discriminiting, analyzing, and interpreting textual, numeric, audio, and visual information;

Communicating -- Writing -- on paper and online;
Speaking -- English and at least one other language;
Presenting -- orally and with multimedia.

"NJEA -- A Dialog Begun... New Jersey School Library Media Center Survey Responses" reported by Dagmar Finkle in EMAnations, the Journal of the Educational Media Association of New Jersey, Fall, 1992, p. 10-15.

Total respondants -- 224 schools
Automated circulation systems -- 27%
Computer based catalog, either CD-ROM or on-line -- 15% with the number split 50/50 on format.

POWERSHIFT: KNOWLEDGE, WEALTH, AND VIOLENCE AT THE EDGE OF THE 21ST CENTURY, by Alvin Toffler, 1990. pp. 360-361.

RURAL AMERICA AT THE CROSSROADS: NETWORKING FOR THE FUTURE, from the Office of Technology Assessment, Congress of the United States. . 1991.

"Telecommunications: Why Is It Changing the Way We Do Business In Schools" by Jeff Holte, St. Louis Schools, in MINNESOTA MEDIA, Vol.17 No.1, Conference Highlights.

Holt described InterNet as "a big highway funded by the federal government. Tips for the novice:

1-Ask if it is appropriate to use online communication or whether it could be done better another way;
2-Start with a small group, class, or teacher;
3-Use simple software, such as packaged network materials (i.e National Geographic Kids Network, etc.)

OTHER REFERENCES

These titles have been taken from the SERVE recent publications list which can be obtained on-line using the SERVE BBS.

TITLE: Beginning Teachers and Computer Networks: A New Form of Induction Support AUTHOR: Merseth, Katherine K.
PUBLISHER: National Center for Research on Teacher Education
DATE: 1990
ANNOTATION: Research report shows that beginning teachers benefit from computer network conferences with other novice teachers. Author states that convenience and confidentiality allow teachers to discuss questions or problems frankly with their peers; computer discussions provide emotional support and reduce isolation.
ORDER FROM: National Center for Research on Teacher Education, 116 Erickson Hall, Michigan State University, East Lansing, MI 48824-1034 (cite order no. TL-RR-90-9, 28 pg, $4.90 prepaid)

TITLE: How Computers are Used in United States Schools: Basic Data from the 1989 L.E.A. Computers in Education Survey
AUTHOR: Becker, Henry Jay
PUBLISHER: Center for Social Organization of Schools, Johns Hopkins University DATE: 1990
ANNOTATION: Study shows teachers and schools do not utilize computers to nearly their full potential in schools. No more than one fourth of high school students' computer time is spent applying computers to their subjects, and students spend the majority of their computer time just learning how to use computer programs.
ORDER FROM: Center for Social Organization of Schools, Johns Hopkins Univ., 3505 N. Charles St., Baltimore, MD 21218 (cite order no. HC-1290-SE, 34 pages, $3.75 prepaid)

TITLE: Using Hypermedia Technology to Support a New Pedagogy of Teacher Education AUTHOR: Lampert, Magdalene, et.al
PUBLISHER: National Center for Research on Teacher Education
DATE: 1990
ANNOTATION: Authors propose hypermedia technology as a solution to teaching teacher education students about new teaching methods. Hypermedia components let students observe teaching and analyze it with their instructor.
ORDER FROM: National Center for Research on Teacher Education, 116 Erickson Hall, Michigan State Univ., East Lansing, MI 48824 (cite order no. IP-90-5, 17 pages, $4.60 prepaid)

TITLE: Using Portfolios in Instruction and Assessment
AUTHOR: Arter, Judith
PUBLISHER: Northwest Regional Educational Laboratory
DATE: 1990
ANNOTATION: Report discusses the use of student portfolios as an additional means of assessing student achievement. It provides examples of how teachers are currently using portfolios, and the many forms they can take.
ORDER FROM: Northwest Regional Educational Laboratory, 101 S.W.

Main St. Suite 500, Portland, OR 97204 (cite order no. NL-1290-SE, 37 pages, $7.40 prepaid)

VIDEO RESOURCES

"Community Computing", National Public Telecomputing Network, Video, 1989. (?)

"EduQuest: The Journey Begins..." IBM Educational Systems Company, Video, 1992.

"KMB Video Journal on Telecommunications Policies and Practices..." Produced by KMB Associates, Vol.7 No.9, 1991.

"National Geographic Kids Network: Introduction" National Geographic Society, Video, 1989.

"SERVE -- Teleconference on Telecommunications", Video, Jan/Feb 1993.

"World CLassroom" Global Learning Corporation, Video, 1990.